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TECHNICAL MEMORANDUM

Utah Coal Regulatory Program

November 7, 2011

TO: Internal File

THRU: Steve Christensen, Lead SC

FROM: Priscilla Burton, CPSSc, Environmental Scientist III PUBS by SRS

RE: Midterm Review, Wildcat Loadout, Intermountain Power Agency, C/007/0033, Task ID #3931

SUMMARY:

The Wildcat Loadout entered temporary cessation on September 10, 2010. The permit was transferred to IPA on June 27, 2011. The objectives of the West Ridge mid-term review are outlined in a letter dated September 29, 2011 to James A. Hewlett. Item A. refers to review of permit conditions and permittee-initiated plan changes.

Soil related permit conditions and commitments are described in Appendix P. The Division should update these commitments in the annual report listing.

The area treated in 2010 east of PR 5 will provide a test of discing rather than gouging as a final reclamation treatment and Section R645-301-240 may need to be revised accordingly.

Future depositions of waste to the waste rock pile from the Horizon Mine will require an amendment to the Wildcat MRP and should include a commitment for acid/toxic sampling and analysis.

To improve accuracy and provide current information, the following corrections to statements in the MRP are requested:

R645-301-231.300 and -121.100, Appendix N should refer to Lynn Kunzler's memo, dated November 17, 1989 in the Correspondence folder, which indicates that the seed mix reported in Appendix N, Table 9 was not seeded, but was modified with approval: the mix did not include any shrub seed and did not include Stipa comata, but it did include Elymeus cinereus (Basin wildrye) and Agropyron trachycaulum (slender wheatgrass). •Section R645-301-224 of the application should state that the 1994 test plots were evaluated in 1997 and should provide a location for the results of the evaluation (refer to 2003\ Incoming\0001.pdf). Section R645-301-

224 should further state that the topsoil test plots were eliminated in 2000, when the surface of the new topsoil pile B was reseeded and indicate that the seed mix used was not recorded.

OPERATION PLAN

TOPSOIL AND SUBSOIL

Regulatory Reference: 30 CFR Sec. 817.22; R645-301-230.

Analysis:

Topsoil Removal and Storage

The acreage of disturbed area is described in MRP, Sections 645-301-212 and R645-301-242.The Wildcat site currently has a deficit of 32,000 yd^3 of topsoil to achieve the goal of six inches topsoil replacement depth over the 61 acres (Sec. R645-301-224 and R645-301-240 "Soil Testing and Preparation"). Accumulations of coal fines were mechanically removed from the zone of heavy deposition in 2010 (area is shown in App. P, Figure 1). The topsoil was stabilized with straw and seeding. Future disturbance of this area for sediment pond construction will include removal of 6 inches of topsoil from the mechanical clean-up area shown on Plate 1-A and will provide 3,000 cu yds towards this deficit (R645-301-212). See Appendix D for the soil survey information.

The existing topsoil stockpiles are located on the west, south and north perimeters of the disturbed area. Plate 13 illustrates the existing topsoil storage piles (certified by David Hibbs, a Professional Engineer, in 2010). Section R645-301-212 and Plate 13 indicate that there is currently of 17,000 yd^3 stockpiled for reclamation. The prevailing winds are from west to east. Topsoil piles E and B are combined and upwind of the site. Topsoil Pile A is located southeast of the coal stockpile and may be affected by windblown coal fines. Appendix P describes plans for future expansion of topsoil stockpile A. .

Proposed plans in Appendix P include construction of the embankment of pond G (see Plate 3G) with subsoil to be seeded with the interim mix and to be used as cover in final reclamation.

Historical Information

Topsoil Stockpiles

Topsoil was salvaged from 20 acres of the site in **1984** and placed in the topsoil stockpiles (Plates, 1 and 13). Stockpiles were consolidated in 1994 (due to coal fine accumulation on the stockpiles located on the east side of the coal stockpile) and pile B now contains all of the soil formerly in B, C, and D. Relocated stockpile B was seeded in the fall of 1994 and now contains 285,810 yd^3. Grab samples were taken from stockpiled soil in 1988 (R645-301-212, p 2-2 and Appendix D). This analytical information provides valuable information on the quality of the pre-existing surface soil. Topsoil has not been salvaged from the ASCA areas shown on Plate 2 (Sec. R645-301-212 p. 2-2).

The topsoil was reseeded in 1989 and 1990 (1989 Correspondence folders, memo from Henry Sauer dated April 25, 1989 and January 23, 1990) using a modified interim mix (memo from Lynn Kunzler dated November 17, 1989).

MRP Sec. R645-301-212, p. 2-3 describes transfer of topsoil piles B, C, and D to the west side of Wildcat for protection against windblown coal fines (in 1994). The transferred topsoil was collectively designated topsoil stockpile B and placed adjacent to existing topsoil stockpile E. The stockpile was seeded in 1994 with an interim seed mix described on page 2-4. The ground exposed by removal of the stockpiles B, C, D was drill seeded with the mixture described on page 2-4. New topsoil pile B was reseeded in December 2002. Topsoil A was recently reseeded in June 2002 (see inspection reports).

Topsoil Substitutes and Supplements

The Permittee established four test plots in 1989 to determine the suitability of the fill as substitute topsoil (Sec. R645-301-212 p 2-6, and Sec. R645-301-224). Revegetation test plots A, B, C, D are located on Plate 1. The information in the files and the MRP appendices D and N reveals the following:

- Fill soil samples from the four test plots were analyzed by Utah State University Plant & Water Analysis Lab in December 1988, analyses were received by the Division on February 15, 1989 (Incoming File).
- Fill test plots were ripped to a depth of six inches and 1 Ton/acre alfalfa hay was incorporated to the same depth (MRP Appendices D), this tilling and mulching with straw was confirmed by Division Inspection Reports dated November 2, 1989 and December 19, 1989 (Appendix N).

- Fill test plots may have been left rough with pitting (MRP, Appendix D) and may have been fertilized with 40 lbs K20; 60 lbs P2O5; and 60 lbs N (as Urea: ½ in Fall of 1989 and ½ in Spring of 1990 (MRP, Appendix D).
- Fill Test plots were hand broadcast with a **modified** version of the interim seed mix decribed on page 2-4 (December 19, 1989 Inspection Report). The approved modification was to delete Needle and Thread Grass and all shrub species and to include *Elymus cinereus* Basin Wildrye (3 lbs/acre) and *Agropyron trachycaulum* Slender wheatgrass (2.5 lbs/ac) (Lynn Kunzler, Memo to file dated November 17, 1989).
- The MRP describes in Appendices D and N a monitoring program for the spoil plots. The fill test plots were to have been monitored in years 1, 2, 3, 5, 9, and 10, but were monitored only once in 1991.
- Fill test plots were surveyed in 1991, two years after seeding, by Patrick Collins (App. N). Although the MRP states that fill test plots were to be re-evaluated in 2006, no further evaluations could be found in the files or in the MRP appendices.

The 1991 survey report by Collins (1991, Appendix N) shows that all the plots were weedy and many of the seeded species were not present. Plot B showed the most positive result with 30% of its 52% cover attributed to the seeded grasses. Plot B is near the substation, east of the railroad tracks. The Division biologist (Jerriann Ernstsen) briefly examined Plot B during a field visit (January 30, 2003) and the plot was still dominated by grasses (species unidentified) and without shrubs. Photographs taken of the test plots on June 23, 2005 are in the photo database.

1988 samples of the soil that were taken in six inch depth increments shed some light on the success of test plot B vegetation. Test plot B soils are loam in texture with pH values between 8.0 and 8.3, Electrical Conductivity values between 3.3 mmhos/cm decreasing to 0.9 mmhos/cm in the profile; and Sodium Adsorption Ratio (SAR) values from 1.3 falling to 0.4 within the profile. Test Plot B had the most desirable characteristics of the spoils sampled. Although spoil Plot A soils were also low in SAR, they were more sandy and would have had less water holding ability in the drought years after the seeding, described by Mr. Collins 1991 survey. Test Plots D and E both are loam texture, but have EC values increasing down the profile to a high value of 4.0 mmhos/cm for spoil D and 3.0 for spoil E. The SAR values for test plots D & E are correspondingly high (from 2.8 to 6.6 for plot D and from 1.6 to 8.5 for plot E).

In addition to the fill test plots, there were four topsoil testplots established on the new topsoil pile B (adjacent to pile E, see Sec. R645-301-2224, p. 2-8. These topsoil test plots were seeded in the fall of 1994 and evaluated once in 1997. Mr. Glasson provided the Division with a copy of the 1997 evaluation of these test plots (incoming folder 3/11/03). The treatments on the topsoil test plots were:

- irrigation vs. no irrigation;

- incorporation of 3 to 4 tons alfalfa hay vs 1 ton alfalfa hay;
- 1 ton alfalfa hay incorporated and 1.5 tons straw anchored with netting vs. 1 ton alfalfa hay incorporated and 1.5 tons oat or barley straw anchored with mesh and staples.

According to Mr. Collins in his July 1997 Evaluation of the Test Plots, conducted 2 ½ years after seeding (Division 2003 Incoming Record 0001):

- Excluding forbs which were all weedy, the percent cover ranged from 38.75% to 43.33%.
- Seeded *Kochia prostrata* (prostrate kochia) and *Agropyron cristatum* (Fairway crested wheatgrass) accounted for most of the cover.
- Mulch incorporation at 3 – 4 Tons/ac greatly increased establishment of Kochia prostrata (a woody shrub) at the expense of grasses. This trend was also noted at lower levels of mulch incorporation.
- Irrigated plots favored grasses.
- Fairway crested wheatgrass (an introduced species) did much better than the native grasses and although it did not exclude the natives, may have created competition limiting their establishment.

The test plots were eliminated in 2000, when the surface of the new topsoil pile B was reseeded. The mix used on the reseeded surface was not recorded in the MRP or Division files.

The MRP provides some parameters to be tested in future plots (page 2-8): native and local seed, different fertilizing techniques (including no fertilizer) and different seedbed preparation. Mr. Collins' 1997 analysis suggests that Fairway Crested wheat seed should be eliminated from the interim seed mix in order to encourage greater diversity in the establishment of grasses.

The Division concurs with Mr. Collins' recommendation of removing Fairway crested wheatgrass from the interim seed mix and eliminating the incorporation of alfalfa hay and surface straw. The Division would also suggest the following techniques be evaluated in future seeding activity: cover the seed by raking to increase shrub germination, employ wood-fiber hydromulch, eliminate fertilizer, reduce mulch to 1 T/ac, and change the timing of seeding to late summer. In keeping with the above recommendations, the 2010 seeding of 7.26 acres east of PR 5 applied the following techniques: 1 ton/ac straw was incorporated into the topsoil, seed was broadcast and disced into the soil. The seed mix below was used in 2010 and was reported in the Incoming folder 10072010a.

Wildcat Seed Mix

Purity	Mixture Contents
12.71%	Sand Lovegrass, VNS
12.03%	Blue Grama, VNS
11.53%	Sand Dropseed, VNS
10.17%	Desert Globemallow, VNS
9.52%	Slender Wheatgrass, FirstStrike
9.52%	Western Wheatgrass, Rosana
9.42%	Thickspike Wheatgrass, Critana
7.38%	White Yarrow, VNS
6.92%	Triticale, Quickgard
6.78%	Indian Ricegrass, Rimrock

The above mix includes both warm and cold season grasses and should improve our understanding of species that are successful and should be included in the final mix.

Findings:

To improve accuracy and provide current information, the following corrections to statements in the MRP are requested:

R645-301-231.300 and -121.100, Appendix N should refer to Lynn Kunzler's memo, dated November 17, 1989 in the Correspondence folder, which indicates that the seed mix reported in Appendix N, Table 9 was not seeded, but was modified with approval: the mix did not include any shrub seed and did not include Stipa comata, but it did include Elymeus cinereus (Basin wildrye) and Agropyron trachycaulum (slender wheatgrass). •Section R645-301-224 of the application should state that the 1994 test plots were evaluated in 1997 and should provide a location for the results of the evaluation (refer to 2003\ Incoming\0001.pdf). Section R645-301-224 should further state that the topsoil test plots were eliminated in 2000, when the surface of the new topsoil pile B was reseeded and indicate that the seed mix used was not recorded.

SPOIL AND WASTE MATERIALS

Regulatory Reference: 30 CFR Sec. 701.5, 784.19, 784.25, 817.71, 817.72, 817.73, 817.74, 817.81, 817.83, 817.84, 817.87, 817.89; R645-100-200, -301-210, -301-211, -301-212, -301-412, -301-512, -301-513, -301-514, -301-521, -301-526, -301-528, -301-535, -301-536, -301-542, -301-553, -301-745, -301-746, -301-747.

Analysis:

Coal processing waste was used (along with subsoils) to create a foundation for the coal stockpiles (R645-301-212 p 2-2; R645-301-512.230 p 5-7). Appendix C, the 1982 Soil and Foundation Investigation conducted by Rollins, Brown and Gunnell, Inc., states on page 2 that in

the vicinity of the truck dump and the coal pile there is between 9 and 12 feet of coal beneath the ground surface. Chapter 5, MRP Section R645-301-512.230 states that 10,000 yd^3 of refuse material has been used as foundation fill.

Refuse Piles

Approximately 44,500 yd^3 of refuse are in the refuse pile (Plate 1 and R645-301-512.230, p 5-8). Refuse (boney) is stored on the west side of the railroad tracks (Plate 1). This refuse was sampled once in 1994 as described in Sec. R645-301-711.100. The leachate analysis results are found in the 1994 Annual Reports. Future depositions of waste to the waste rock pile from the Horizon Mine will require an amendment to the Wildcat MRP and should include a commitment for acid/toxic sampling and analysis.

Section 645-301-512.230 discusses the use of coal mine waste as substitute fill during operations, as well as separate handling and final disposal of the coal mine waste under four feet of subsoil.

Findings:

The information provided meets the minimum requirements for Coal Processing Plants Not Located within the Permit Area of a Mine.

HYDROLOGIC INFORMATION

Regulatory Reference: 30 CFR Sec. 773.17, 774.13, 784.14, 784.16, 784.29, 817.41, 817.42, 817.43, 817.45, 817.49, 817.56, 817.57; R645-300-140, -300-141, -300-142, -300-143, -300-144, -300-145, -300-146, -300-147, -300-147, -300-148, -301-512, -301-514, -301-521, -301-531, -301-532, -301-533, -301-536, -301-542, -301-720, -301-731, -301-732, -301-733, -301-742, -301-743, -301-750, -301-761, -301-764.

Analysis:

General

Acid- and Toxic-Forming Materials and Underground Development Waste

Acid and Toxic Forming Materials sampling information is found on p. 7-5 in Sec. R645-301-711.100. The analysis of the 1994 leachate from coal and refuse by Commercial Testing and Engineering Co. is found in the 1994 Annual Report.

The analysis of the refuse material (soil) by Utah State University Soil Plant and Water Analysis Laboratory is included as Attachment 2 of Appendix J (Probable Hydrologic Consequences). These analyses indicate that there is 0.53% sulfur and 0.8 % CaCo3 in the coal and 1.02% sulfur and 9.5% CaCO3 in the boney. (The methods used were not disclosed and so

the following calculations that are based on the relative concentrations of sulfur and carbonate may not accurately reflect the acid base accounting.) Based upon these 1988 reports, the Division calculates that more than 16 Tons of calcium carbonate/1000 tons coal would required to neutralize the total sulfur in the coal. More than 32 tons CaCO3/1000 tons of boney would be required to neutralize the sulfur in the boney. The base potential of Standard Laboratories, Inc., analyzed a separate sample in 1985 and reported 0.04% pyritic sulfur (found in App. J). Based upon the pyretic sulfur content, only1.25 tons CaCO3 equivalents/1000 tons waste would be required to neutralize the pyretic sulfur in the waste.

Section 645-301-512.230 discusses the use of coal mine waste as substitute fill during operations, as well as separate handling and final disposal of the coal mine waste in the refuse pile under four feet of subsoil.

Findings:

The information provided meets the minimum requirements for Coal Processing Plants Not Located within the Permit Area of a Mine.

SUPPORT FACILITIES AND UTILITY INSTALLATIONS

Regulatory Reference: 30 CFR Sec. 784.30, 817.180, 817.181; R645-301-526.

Analysis:

The Division Order, dated December 9, 2004 (2004/Outgoing/0026.pdf), describes the effect of fugitive dust on plants and wildlife and required that the Permittee make three adjustments to their operations plan in accordance with R645-301-526.220 *et seq* to reduce wind blown deposition of coal fines. There were three commitments added to the MRP to comply with the Division Order, dated December 9, 2004, as follows:

1) Appendix P describes gravel and magnesium chloride improvements to "the truck haul portion" of road PR-5. (Primary roads are identified on Plate 1A.) Appendix P also describes construction of sediment pond G to retain coal fines within the permit area. MRP Section R645-301-423.200 describes maintenance of coal stockpile(s) moisture at 6% to reduce fugitive dust.

2) Appendix P describes removal of coal fines from 5.43 acres using scraping equipment or by vacuuming (App. P, and Sec. R645-301-423.200, p. 4-10 and R645-301-212, p. 2-4). Vacuuming, followed by seeding, may be acceptable in this instance, on less than two acres, to avoid the greater disturbance that would be caused by the destruction of existing woody vegetation. See deficiency written under R645-301-352 et al.

3) Appendix P states that the site will be monitored and photographed quarterly and the results of monitoring will be provided with the annual report.

The second item listed above was completed in late September 2010 by Andalex Resources, Inc. Coal fines were scraped from the 7.26 acre area. Topsoil was not removed. Straw bales were distributed over the 7.26 acre area at a rate of 1.17 tons/acre and disced into the topsoil. Seed was hand broadcast at a rate of 47.21 lbs/ac. These application rates are documented in emails from Dave Shaver and sent to the incoming folder on 9/10/2010 and 9/29/2010.

When the loadout again becomes active, items 1 and 3 above will become the responsibility of IPA.

Findings:

The information provided meets the requirements of the Utah R645 Coal Rules.

STABILIZATION OF SURFACE AREAS

Regulatory Reference: 30 CFR Sec. 817.95; R645-301-244.

Analysis:

Reclaimed areas will be gouged as described in Sec. R645-301-240, "Planting and Seeding Methods," then hydroseeded and hydromulched. All seeded areas (illustrated on Plate 9) will be treated with hydromulch (1 Ton/ac) and tackifier to stabilize the regraded soil (Sec.R645-301-240, "Mulching Techniques"). Riprap may be used for soil stability, presumably along drainages (Sec. R645-301-242.320). Repair of erosion is described in Sec. R645-301-212, "Backfilling, Grading, and Soil Replacement and Stabilization."

Gouges are described in Section R645-301-240 as 18 in. deep x 2 - 3 ft. wide, spaced 6 – 10 feet apart. Existing Plate 10 illustrates the final slope as 20h: 1v (about 4%). The problems with creating gouges in this manner are that the gouges will be deeper than replaced topsoil and the topsoil that is removed from the gouge becomes a mound adjacent to the gouge. The gouge has steep sides that will not retain seed. The gouges are often spaced too far apart.

The effectiveness of such deep pits (gouges) on such a gentle slope was therefore questioned and surface stabilization treatments performed in 2010 east of PR 5 did not employ

gouging. The 7.26 acre area that was vacuumed on August 30, 2010 to remove coal fine accumulations was disced along the contour on October 4, 2010 and further treated as follows:

Stakes were placed in the center of each half-acre using GPS.
1,000 lb bales of hay were placed near each stake to result in an application rate of 2,000 lb/ac hay (scattered by hand).
Site was roughened by discing along the contour
50 lb bags of the interim seed mixture were divided in half with each half being hand broadcast over a ½ acre area (using stakes) to arrive at an application rate of 40 lbs/ac.

The area east of PR 5 will provide a test of discing as a final reclamation treatment and Section R645-301-240 may be revised accordingly.

Findings:

The information provided meets the minimum reclamation surface area stabilization requirements for Coal Processing Plants Not Located Within the Permit Area of a Mine. The area treated in 2010 east of PR 5 will provide a test of discing rather than gouging as a final reclamation treatment and Section R645-301-240 may need to be revised accordingly.

RECOMMENDATIONS:

Appendix P, describes commitments for coal fine deposition control, including road surface treatments and monitoring that are the responsibility of IPA. The Division should add these ongoing commitments to the annual report listing.

The area treated in 2010 east of PR 5 will provide a test of discing rather than gouging as a final reclamation treatment and Section R645-301-240 may need to be revised accordingly.

Future depositions of waste to the waste rock pile from the Horizon Mine will require an amendment to the Wildcat MRP and should include a commitment for acid/toxic sampling and analysis.